An Approach for Quality Improvement in Technical Education

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Abstract

Technical Education in India is facing lot of challenges as the demand for qualified engineers is ever increasing due to fast growing information technology and its enabled services. Though a large number of engineers pass out every year, but not all of them are employment ready. The causes for this may be many, but most of them are related to the type of education and training provided by the technical institutes. In this paper an attempt has been made to critically examine the problems in our present system of technical education system and to bring out suggestions in order to make improvements in the system.

Key Words: Quality, Total Quality Management, Technical Education, Trained and Motivated Faculty, Competence, Responses, Private Institutes.

Introduction

The main purpose of this work is to investigate the problems and prospects of Technical Education in India. In recent years, numbers of institutions have increased and their quality is a major concern (Desai & Kulkarni, 2014)) Quality is mostly related to the faculty and type of education and training provided by our technical institutions (Khanna, 2009).

Since technical education determines the development and socio economic condition of a country, there is a greater need for high quality technical education to produce technically skilled manpower in India (Jamwal & Range, 2007). Quality of graduating student depends on the quality of processes followed by the Institution, apart from his/her own capability. So the institutions must focus on the quality of its processes. (Khanna,2009). Unfortunately, there is a general lack of awareness about quality improvement system. In this regard, every stakeholder of the institution must be convinced that the institute is committed to the quality improvement procedures and their implementation.

Literature Review

Quality is a measure of excellence. Many authors have defined the term quality in education, as "excellence in education", "value addition in education", "fitness of educational outcome and experience for use", defect avoidance in education process", "meeting or exceeding customers' expectations of education", etc. A number of authors have emphasized use of Total quality Management (TQM) principles to improve the quality of technical education.

Pandit, Rao & Jeyathilagar (2009) state that this is the right time to give more importance to quality education and implementation of TQM practices may certainly help the students to get quality education. Deshmukh (2006) has explained the usefulness of TQM concept for Technical education. .Mahapatra & Khan (2006) have identified critical factors for successful implementation of TQM. Sahney, Banwet & Karunes (2004) defined quality in education from TQM perspective and asserted that the quality of education is becoming important, particularly so in higher education. According to Tari

(2006) management Leadership is a key factor in the success of TQM in higher education institutions. When top management is committed to quality, adequate resources will be allotted to quality improvement efforts (Karuppusami & Gandhinathan, 2006); Pandi & Rao (2007) have explained about the application of TQM for achieving global quality in technical institutions. For Desai & Kulkarni (2014) quality is a major concern in technical education. Manjule & Pardhe (2014) have outlined the use of six sigma as an important tool in engineering education.

Research Objectives

The main purpose of this work is to

- Investigate the problems of technical education system,
- Highlight reasons for lack of quality in technical education.
- Recommend strategies for improvement of quality in technical education.

Research Methodology

The city of Jabalpur has twenty engineering institutes, both in the Private as well as in State and Central Government sector. As the problem is more acute in the institutes in the private sector, five good ranking institutes were chosen for the survey. The survey was carried out on fifty final year students of each of the five institutes. The students chosen belonged to four or five different branches. This was done in view of the fact that these final year students have already spent more than three years in the institute and have become familiar with the working of the institute.

This paper employs a statistical survey methodology for identifying the quality related problems faced by the institutions, especially by the private institutions. It involves two steps, namely data collection and data analysis.

- For collection of data, a questionnaire was designed. The questionnaire had 19 questions and was served to 250 students of five different technical institutes located in the city of Jabalpur, India. Responses were received from 50 students of each of the five selected institutes.

Questionnaire

This is only an academic exercise and your response for the following questions will be used for the purpose of evaluation of existing facilities.

5-Strongly Agree	4-Agree	3- Undecided	2-Disagree	1-Strongly Disagree

S. No.	**Please respond to the items by writing either 5 or 4 or 3 or 2 or 1,in the last column**	
1.	Physical Layout of Laboratories is satisfactory.	
2.	Laboratories are well equipped	
3.	Laboratories are properly utilized	

4.	Sufficient computer facilities are available	
5.	Quality of available Transport facility for students is good	
6.	Quality of available First-aid facilities is. good	
7.	Quality of available Hostel facilities is. good	
8.	Fire Fighting facilities are adequate	
9.	Research and development activities are available.	
10.	The latest books/ Journals are available in the library	
11.	Online sufficient research/ internet facility is available in the library.	
12.	Faculties are academically sound	
13.	Faculties are competent to use instructional facilities/AV. aids	
14.	The faculty provides you new knowledge and has command over the subject.	
15.	The Lecturers are well prepared, organized and course material is well structured.	
16.	The faculty was able to deliver Lectures with good communication skills.	
17.	Present curriculum of Technical education (a) Meets the industrial needs.	
	(b) It is at par with international standard.	
18.	Curriculum is frequently/periodically revised to incorporate latest practices in industry.	
19.	Industrial tours are arranged Periodically	

Each of the nineteen questions had five responses- Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree, on a numerical scale of five. Five marks were allotted for Strongly Agree and one for Strongly Disagree, in the decreasing order.

- The next step was to analyze the collected data.. Data collected on the above five-point scale was analyzed using Chi Square test at a level of significance of 0.05. Acceptance and rejection criteria of the hypothesis were based on the calculated value of Chi Square. . The formula for calculation Chi-Square χ^2 is stated as follows.

$$\chi^2 = \Sigma \frac{(fo - fe)^2}{fe}$$

Where

fo = frequency of observed or experimentally determined facts.

fe = expected frequency of occurrence on hypothesis.

Acceptance Criteria :- If the calculated value of χ^2 is less than the table value then the hypothesis is accepted.

Rejection Criteria. If the calculated value of χ^2 is equal or grater than the table value then the hypothesis is Rejected.

Sample Calculations

Table 1: Statement "Physical layout of laboratories is satisfactory"

Status	Strongly Agree (SA)	Agree (A)	Undecided (U)	Disagree (DA)	Strongly Disagree (SDA)
Observed (fo)	10	16	9	10	05
Expected (fe)	10	10	10	10	10
$(fo - fe)$	0	6	-1	0	-5
$(fo - fe)^2$	0	36	1	0	25
$\frac{(fo - fe)^2}{fe}$	0	3.6	0.1	0	2.5

χ^2 =6.2

χ^2 value is Less than the table value at 0.05 level, hence the statement "Physical layout of laboratories is satisfactory" is accepted for the college.

Similar calculations were carried out for other items and other colleges.

On the basis of the analysis and interpretation of data recommendations were made.

Conclusions

In India, More emphasis is given to classroom teaching, especially in technical education. Other factors, which are responsible for effective teaching, have been included in the survey form filled by students. Effective teaching bears a direct impact on the quality of education process. Most of the stakeholders who participated in the survey expressed their concern for lack of Research and Development activities, Curriculum up gradation, improvement in instructional facilities, library facilities, and faculty competence in use of audio-visual aids. Basically these institutes provide basic education up to graduation level, and they are not involved in Research and Development activities as is the case with IITs and NITs. Regarding curriculum up gradation, the Private Institutes do not have any say, as it is governed by Academic Bodies

of the affiliating University, which does not have any representation of faculties from Private Institutes. Thus Private Institutes can only suggest the changes without being part of the decision making body. As compared to this, IITs and NITs are single unit Autonomous Institutes and they can bring about the changes in curriculum, as and when deemed necessary. Faculty competence in use of audio-visual aids is another matter which has to be looked into. Other issues cited by students were made known to the management of the institutes and they were requested to give due importance to the concerns of the students in their future plans. The Management promised to make sincere efforts in order to improve the quality of technical education provided by them.

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RECOMMENDATIONS

1. Present curriculum of Technical education is not at par with industrial needs and international standards, Thus Curriculum should be frequently/periodically revised to incorporate latest practices in industry.
2. Faculties are not competent to use instructional facilities/ A.V. aids, thus, an improvement is required in it.
3. Emphasis should be given on appointment and retention of qualified experienced and competent facility members so that these faculty provide new knowledge to the students and deliver the Lecturers with good communication skill.
4. Some Emphasis should be given to teaching methodology so that Lectures are well prepared, organised and course course material is well structured.
5. Laboratories should be well equipped.
6. Laboratories should be properly utilized.
7. Good quality of transport facilities should be available for students.
8. Good quality of hostel facilities should be available for students.
9. Improvement is required in the availability of Research & Development activities.
10. The latest Books/Journals should be available the library.
11. Faculties should be academically sound.
12. Improvement is required for the availability of computer facilities for different technical institutes.
13. Physical layout of Laboratories should be satisfactory.
14. Some Improvement is required in the availability of first aid facilities.
15. Fire fighting facilities should be adequate.
16. Online sufficient research/internet facility should be available in the library.
17. Emphasis should be given to industrial tours.